



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,667	01/22/2002	Norihisa Mino	10873.876US01	8002
23552	7390	10/16/2003	EXAMINER KOPPIKAR, VIVEK D	
MERCHANT & GOULD PC P.O. BOX 2903 MINNEAPOLIS, MN 55402-0903			ART UNIT 1775	PAPER NUMBER 6
DATE MAILED: 10/16/2003				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/055,667

Applicant(s)

MINO ET AL.

Examiner

Vivek D Koppikar

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 January 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above claim(s) 13-35 and 41-55 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 9-12 and 36-40 is/are rejected.
- 7) ☒ Claim(s) 7-8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3-5. 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-12 and 36-40, drawn to a substrate with a layer of aligned fine particles, classified in class 428, subclass 403.
  - II. Claims 13-35 and 41-55, drawn to a method of producing aligned fine particles, classified in class 427, subclass 384.
2. Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the substrate with a layer of aligned fine particles could be formed by a process in which a substrate is immersed in a bath containing a highly viscous organic solvent and particles and then removed and cured in order to form the highly viscous organic solvent into an organic film which coats the substrates as well as the particles.
3. During a telephone conversation with Douglas Mueller on August 22, 2003 a provisional election was made with traverse to prosecute the invention of I, claims 1-12 and 36-40. Affirmation of this election must be made by applicant in replying to this Office action. Claims 13-35 and 41-55 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.
4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the

Art Unit: 1775

currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-6, 9-10 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent Number 5,609,907 to Natan.

Natan is directed towards a substrate coated with self-assembled metal colloid monolayers.

With regard to Claim 1, Natan teaches a process of coating a substrate with a bifunctional organic film to impart a functionality on the substrate that allows for the bonding of metal colloid particles. Next the organic film coated substrate is contacted with a solution of colloid metal particles and the particles become bound to the functional groups on the organic film. The metallic particles have an affinity for certain functional groups. Thus the metallic particles are also coated in the organic film (Col. 3, Ln. 39-59 and Claim 1).

With regard to Claim 2, in one embodiment of Natan a single layer of an assembly film in Natan consists of an alignment of fine particles (Figure 1D, Subfigure C).

With regard to Claim 3, in one embodiment of Natan the fine particles are aligned in the form of accumulated layers and the fine particles are bonded to each and immobilized as is apparent from the figure (Figure 1D, Subfigure D).

With regard to Claim 4, the fine particles have a size of between 3 to 100 nanometers (Claim 7).

With regard to Claim 5, the organic coating film of Natan is self-assembling (Col. 3, Ln. 39-42).

With regard to Claim 6, figure 1b shows that the fine particles are patterned and aligned on the surface of the substrate (Figure 1B).

With regard to Claim 9, the organic coating film used in Natan forms covalent attachments to the surface (Col. 3, Ln. 1-4).

With regard to Claim 10, the fine particles in Natan are either Au or Ag (metals) (Col. 3, Ln. 39-42).

With regard to Claim 12, the substrate in Natan is either a metal or metal oxide (tin oxide) (Claim 2).

7. Claims 1, 4, 9, 10 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 82/02403 to Nguyen.

Nguyen is directed towards a photo setting composition for coating substrates with an abrasion-resistant, transparent film.

With regard to Claim 1, Nguyen teaches an olefinic composition (organic film) containing a mineral filler. The mineral filler is in the form of silica or alumina particles. The surfaces of the particles are grafted with organic groups to make them organophilic and

Art Unit: 1775

compatible with the olefinic composition. When the particles are organophilic they become immobilized by chemical bonds when they are placed in the organic coating matrix (Page 7, Ln. 33- Page 8, Line 19; Page 18, Ln. 10-20 and Claim 1.

With regard to Claim 4, in Nguyen the size of the particles embedded in the organic matrix is between 7 to 30 nm (Page 9).

With regard to Claim 9, in Nguyen the organic coating surrounding the particles are bonding to the olefinic composition (the organic film) through chemical bonds (covalent bonding) (Page 18, Ln. 10-20).

With regard to Claim 10, in Nguyen the particles are either silica or alumina (metal oxides) (Claim 1).

With regard to Claim 12, in Nguyen the substrate is glass in one embodiment (Page 1, Ln. 19-24).

### *Claim Rejections - 35 USC § 103*

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Number 5,609,907 to Natan as applied to Claim 1 above and in further view of US Patent Number 5,045,249 to Jin.

In Natan the particles used in the organic film are not magnetic.

Art Unit: 1775

Jin is directed towards an electrical interconnection by a composite medium in which magnetic particles (6) are embedded in an organic matrix (5) (Figure 1 and Col. 1, Ln. 65-Col. 3, Ln. Col. 3, Ln. 6). At the time of the invention one of ordinary skill in the art would have used magnetic particles in the organic film of Natan as taught in Jin with the expectation of obtaining a substrate with magnetic properties.

10. Claims 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Number 6,404,602 to Sasaki in view of US Patent Number 5,609,907 to Natan.

Sasaki teaches a magnetoresistive device with an organic insulating layer (Col. 5, Ln. 4-13 and Col. 6, Ln. 52-54). Electrodes are present in order to change the electrical resistance with the use of an external signal magnetic field and a current (Col. 15, Ln. 59-Col. 16, Ln. 1-5). The device also includes a shield for shielding the magnetoresistive device (Col. 2, Ln. 42-48) and a yoke for guiding the magnetic field (Col. 10, Ln. 29-42).

In Sasaki the organic insulating layer does not include particles formed within the layer.

Natan teaches a process of coating a substrate with a bifunctional organic film to impart a functionality on the substrate that allows for the bonding of metal colloid particles. Next the organic film coated substrate is contacted with a solution of colloid metal particles and the particles become binded to the functional groups on the organic film. The metallic particles have an affinity for certain functional groups. Thus the metallic particles are also coated in the organic film (Col. 3, Ln. 39-59 and Claim 1).

At the time of the invention, one of ordinary skill in the would have been motivated to add particles within the organic film layer of Sasaki as taught in Natan with the expectation of

Art Unit: 1775

obtaining a magnetoresistive device with a uniform roughness and a high degree of stability and durability over time as recited in Natan (Col. 3, Ln. 33-38).

11. Claims 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Number 6,465,342 to Taguchi in view of US Patent Number 5,609,907 to Natan.

Taguchi teaches a semiconductor device with a barrier layer (54) and an organic insulating layer (52) (Figure 8A and Col. 2, Ln. 38-53).

The organic insulating layer in Taguchi does not teach an organic film which consists of fine particles embedded within the film.

Natan teaches a process of coating a substrate with a bifunctional organic film to impart a functionality on the substrate that allows for the bonding of metal colloid particles. Next the organic film coated substrate is contacted with a solution of colloid metal particles and the particles become binded to the functional groups on the organic film. The metallic particles have an affinity for certain functional groups. Thus the metallic particles are also coated in the organic film (Col. 3, Ln. 39-59 and Claim 1).

At the time of the invention, one of ordinary skill in the would have been motivated to add particles within the organic insulating layer of Taguchi as taught in Natan with the expectation of obtaining a magnetoresistive device with a uniform roughness and a high degree of stability and durability over time as recited in Natan (Col. 3, Ln. 33-38).

***Allowable Subject Matter***

12. Claims 7-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.



Art Unit: 1775

The prior art of record does not teach or suggest aligning fine particles in a concave portion of a concave and convex pattern which is formed on the substrate. In Natan the particles are aligned in both the concave and convex portions of the patterns which are present on the substrate (Figure 1D, Subfigures A-C).

*Conclusion*

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Vivek Koppikar** whose telephone number is (703) 305-6618. The examiner can normally be reached on Monday-Friday from 8 AM to 5 PM, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones, can be reached at (703) 308-3822. The fax phone numbers for the organization where this application or proceeding are assigned are (703) 305-7718 for regular communications and (703) 305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

*Vivek Koppikar*

Vivek Koppikar

10/1/03

*Deborah Jones*  
DEBORAH JONES

SUPERVISORY PATENT EXAMINER